PUBLIC MORTGAGE INSURANCE IN CANADA: ITS RELEVANCE TO THE 1980'S AND BEYOND

by

Lawrence D. Jones
University of British Columbia

Prepared for CMHC

November 1984

I. INTRODUCTION

Public mortgage insurance was introduced in Canada via the National Housing Act of 1954. Through the three decades of the CMHC administered program, default insurance has been used, or has been recommended as an appropriate policy to fulfill a multiplicity of objectives. In view of the time that has passed, the major changes that have occurred in the structure of the residential mortgage market, over a decade's experience with private mortgage insurance and dramatic shifts in the focus of housing policies, it is appropriate to conduct a systematic review of the relevance of public mortgage insurance.

Ultimately such a review should be focussed upon developing recommendations for selection of one of the following courses of action:

(1) to expand the scope of the existing CMHC mortgage insurance program,

(2) to allow the program to remain about as is,

(3) to reduce the program to match a narrower, operable set of objectives than are currently articulated, or

(4) to eliminate public mortgage insurance altogether.

This paper is designed to contribute to the initial stages of this review process. We begin (Section II) by attempting to identify all of the housing market and mortgage market objectives of government intervention which have been associated with public mortgage insurance since its inception, as well as to isolate any other policy objectives for which mortgage insurance might conceptually be an appropriate tool. The goal in this section is to narrow the set of objectives to those which have sufficient potential relevance in 1984 that they might serve as justifications for creation of a public mortgage insurance program at this time if none was in existence.

In Section III we examine the objectives which survived the filter in Section II more carefully and focus upon the effectiveness of public mortgage insurance as an instrument for achieving those objectives. Having further narrowed the list of plausible roles for mortgage insurance we consider (Section IV) whether either CMHC or the private mortgage insurance industry can be relied upon to fill the perceived need, and suggests how an alternative supplier might be structured.

II. EVALUATION OF RATIONALES FOR PUBLIC MORTGAGE INSURANCE

Public mortgage insurance was introduced in 1954 to fulfill a proximate objective of increasing the supply of private residential mortgage credit. This objective in turn appears to have derived from a goal of providing potential borrowers with a more attractive matrix of price and loan terms and a surer availability of mortgage credit than would exist in the absence of government intervention. This form of intervention has been justified by virtually the entire arsenal of welfare economics rationales for government action. These include direct appeals to both intrinsic and empirically observed characteristics of the residential mortgage market as well as rationales derived from housing policy objectives. The mortgage market has been alleged to be characterized by i) an imperfectly competitive market structure, ii) uncertainty (uninsurable risks) and iii) the public goods nature of much market information. However, even assuming that it was agreed that these attributes impaired the efficiency of mortgage markets it is unlikely that they would, by themselves, have provided the basis for a generalized program of government intervention. Rather, the magnitude of the government policy initiative must reflect the view that the demand for residential mortgage financing is largely derived from the demand for housing.

Policy makers appear to have adopted the view that housing has peculiar positive externality and merit good attributes; consequently the private market left to itself will not provide enough housing services in general or in the right places in the matrix of geographic location and household attributes. Moreover, the form of tenure, itself, is viewed as belonging in the social objective function; homeownership per se being regarded as having peculiar merit good and positive externality status. Thus, in this view, mortgage market intervention in the form of public mortgage insurance is intended to assist in meeting ultimate housing stock, quality and distribution objectives.

Finally, once public mortgage insurance was in place it was viewed by government as a convenient tool for meeting goals not likely contained in the original list of policy justifications. These have included generalized income distribution, macroeconomic growth and stabilization, employment creation and construction industry stabilization objectives. While it may be argued that using an existing policy instrument is more cost effective than creating a new tool more tailored to the specific objective, it is clear that the long list of objectives employed to justify mortgage insurance renders evaluation of the contemporary desirability of the program a complex task. In this section we will attempt to sort through the myraid objectives from a 1954 perspective and again from a 1984 vantage point in order to identify those goals that are most likely to be relevant to public mortgage insurance in the remainder of this century. We begin the process of evaluating the relevance of various social objectives by focussing in Section A on the externality, merit good and equity issues relating to the quality, quantity, tenure mode and distribution of the Canadian housing stock. Then in Section B we address attributes of the mortgage market that might serve as a basis for policy intervention.

A. Housing Objectives

The concepts of merit goods and externalities, and the distinction between these concepts, are slippery in the best of applications and suffer particularly from vagueness and ambiguity when addressed in the sea of platitudes surrounding housing goals. Merit goods are those which contribute to the social utility function beyond the utility realized by the individual consuming the good. The concept embodies a collective view of social equity. The notion of an equitable distribution of income and wealth reflects some basic social consensus about fairness; when this principle is extended to the proposition that each individual should be able to consume not only some minimum level of goods and services but some minimum level of specific goods and services, then these particular commodities have special status as merit goods. In North American culture, housing often appears to have been awarded the highest position in the rank ordering of merit goods.

It is this social meritocracy that Smith (1981b) presumably has in mind when he asserts that Canadian housing policy in the Seventies was based upon the "... belief that housing was not a good whose consumption should be subject to the usual income constraint but rather was a basic right ..."[1] Although Smith regards this as a newly found belief adopted by the governments in place in the 1970's it seems more plausible that the merit good concept in part underlay the introduction of mortgage insurance in 1954, as well as the housing policy based on direct loans and guarantees which preceded the insurance program.

Housing in general and homeownership in particular have been alleged to generate a wide variety of externalities. The implication is that, given national income and its distribution, a better housed society will have less infectious disease, less crime and other forms of antisocial behavior and more responsible citizens less vulnerable to radical social or political movements.

These socialization effects of good housing are sometimes presumed to be reinforced by ownership; these interests in real property along with the lesser mobility associated with ownership are viewed as strengthening ties to neighborhoods and to the sociopolitical status quo. Thus some may believe that the political unrest in and emigration from Quebec would have been of much less significance if the Quebec homeownership rate had been more like the national average. We have no real evidence to support the externality or merit good virtues of housing other than the repeated assurances of political figures. Lacking any specific reason to disbelieve, it is incumbent upon analysts to presume that political oratory does reflect some basic perceived beliefs of the public, while remembering that sometimes the political rhetoric survives long after the issue in question has faded into relative insignificance.

Applying these rationales for government intervention to the early 1950's, we do find that meritocracy and externalities were at least translated into reasonably operable minimum standards; these revolve around crowding, indoor plumbing and the state of repair of the housing unit. Crowding has been measured in two primary ways: (1) the incidence of more than one family per household and (2) the incidence of households with more persons than rooms in the housing unit. As of 1951 these incidences were 9.4 percent and 18.8 percent respectively; however, by 1981 these percentages had been reduced to 1.1 and 2.5 (CMHC Canadian Housing Statistics 1983, Table 104). Similarly indoor plumbing was virtually universal by 1981 although only 56.9% of dwellings had such facilities in 1951.[2] By any measure the standard of maintenance and repair of the housing stock had vastly improved by the beginning of the Eighties relative to the situation three decades earlier. Homeownership rates increased for most age specific population cohorts over the three decades, including quite

substantial gains during the Seventies despite the dramatic growth of nonfamily households.[3]

There is evidence in the initial structure of NHA mortgage insurance program that i) increasing the size of the housing stock to alleviate overcrowding, ii) improving the basic quality of the stock and iii) inducing higher ownership rates were prime goals. The objective of increasing the number of housing units is embodied in the original restriction of NHA mortgage insurance to newly constructed units. The emphasis on quality is reflected in repeated assurances that NHA construction standards and inspection procedures have ensured higher quality housing.[4] Maximum loan limits were included to help insure that the increased private mortgage credit generated was targeted to producing housing units for lower-middle income households. The restriction in the original program to detached single family units is consistent with the goal of using mortgage insurance to induce higher rates of ownership.

If public mortgage insurance did not exist in 1984 would its introduction be perceived as desirable to i) reduce crowding, ii) improve housing quality, or iii) induce a higher incidence of ownership? There can be little doubt that these goals would not provide any significant support for initiation of a general mortgage insurance program. No new standard of crowding has been introduced to justify further efforts to increase the number of housing units in relation to the population. On the contrary the most dramatic event of the past twenty years has been the explosive growth of headship rates[5] which has led some observers to the view that an excessive amount of capital formation has been devoted to housing to the detriment of real aggregate macroeconomic growth prospects.[6] A number of years of elevated housing completions together with dramatic increases in housing renovation and alteration investment have effectively eliminated housing quality as an issue.

During the 1970's most observers agreed that the systematic bias toward ownership was accentuated by interaction between changes in tax laws and higher levels of expected inflation.[7] If further ownership incentives were viewed as justifiable, it seems likely the policy instrument of choice would be alterations in tax legislation, not introduction of public mortgage insurance. The housing issue which achieved prominence in the past decade, "affordability" is an issue relating to household cash flow and capital structure options likely to be perceived as resolvable through macroeconomic policy and the redesign of mortgage loans.[8] The potential role of mortgage insurance in facilitating mortgage loan innovations will be considered below.

In sum, the traditional housing objectives do not appear to form a basis for introducing a public mortgage insurance program, if none existed, in 1984. Moreover, these issues do not appear to provide a justification for retaining the existing mortgage insurance program in its current scope. The only conceivable role for public mortgage insurance in this context would be to target assistance to specific narrowly defined groups for whom housing may still be considered to be a merit good. Such groups might perhaps include the Native people, the handicapped, low income elderly, households in remote areas, students or low income single parents. The case has to be made, however, that such groups are peculiarly disadvantaged in terms of their ability to find market solutions to their housing demands and that mortgage insurance is an effective policy tool to achieve the housing delivery objective.

B. Mortgage Market Objectives

In principle, government intervention aimed at impacting the cost and availability of mortgage funds could be based on either of two fundamental propositions. The first possibility is that the judgment is reached that the

size, quality or distribution of the housing stock will be socially suboptimal if left to private market decisions, followed by the further judgment that the most effective means of achieving an optimal housing stock is via intervention in the residential mortgage market. A second justification for mortgage market intervention is that this market itself, independent of the implications for housing, meets some of the classic criteria for government action. As observed above the criteria most likely to be held relevant in the latter case are the existence of i) an imperfectly competitive market structure, ii) uncertainty based on inadequate or incorrect information or iii) absence of market facilities to supply liquidity, hedging or risk pooling due to scale economies, uninsurable risks or the costs of information dispersal. Some views of the nature and structure of the mortgage market would permit both justifications to exist simultaneously; indeed, it is unlikely that substantial government intervention would have been deemed desirable in the residential mortgage market, despite pure financial market justifications, except for the perceived linkage between investment in housing and this particular credit market.

The existence of this housing asset-mortgage credit linkage is a critical precondition for justifying mortgage supply interventions, including mortgage insurance, as efficient policy tools to achieve housing goals. The strength of the linkage in turn depends upon the strength of several prerequisites, namely:

(1) The activities of residential land development, construction, investment in rental housing and investment in owner-occupied housing are heavily dependent upon debt financing.

(2) For most developers, builders, real estate investors and especially, potential homeowners, there are no significant debt financing alternatives to residential mortgage credit.

(3) Residential mortgage financing is applied almost exclusively to housing development, construction and investment.

(4) The demand for housing is interest and terms elastic.

Substantial leakages in any of these links will compromise the ability of mortgage supply intervention to affect housing objectives.

The presupposition underlying the introduction of mortgage insurance in 1954 was that residential mortgage supply suffered from a substantial credit gap; i.e. existing or latent demand for mortgage credit was not being met at existing prices, or would not be met absent the joint loan program. This situation might reflect market structure imperfections, results of government interventions, or information gaps that might exist even in a purely competitive market free of government interference. Table 1 illustrates one concern that would have existed at the time the mortgage insurance initiative was under consideration. In 1954 the only significant private source of mortgage credit was provided by life insurance companies and as reflected in Table 1 governmental direct lending had been a major source of mortgage financing throughout the post World War II period. The limited private lender participation outside life insurance companies undoubtedly created fears of market concentration if government were to cease its lending programs. In principle, government might also have been concerned about substantial gaps in the mortgage loan menu associated with one dominant type of private financial intermediary. Since life insurance companies had long term fixed interest liabilities, their pursuit of an immunization objective would probably result in the matrix of loan provisions offered lacking richness in maturity, duration and prepayment options. However, this was not likely regarded as a significant concern in the environment of the early Fifties.

The introduction of mortgage insurance in 1954 provided a mechanism for the federal government to continue a mortgage supply intervention policy, but in a manner that encouraged additional private sector supply of funds which could substitute for direct government loans and allow the joint lending approach to

Table 1

Market Shares of Mortgage Loans Outstanding of
Various Institutional, Corporate and Government Lenders

	1953	1982
Life Insurance Companies	48.2%	13.6%
Chartered Banks	-	9.1
Loan Companies[1]	12.1	17.2
Trust Companies	5.1	20.6
Credit Unions	5.3	11.3
Pension Funds	-	4.9
Estate, Trusts and Agency Funds of Trust Companies[2]	-	7.7
Other Companies[3]	1.1	2.3
Corporate Lenders	1.7	2.0
Governments and Government Agencies	26.4	11.4
	100.0	100.0

1 Includes Mortgage Investment Corporations in 1953.

2 Includes funds managed for trusteed pension funds; these funds are not included in the 'Pension Funds' column.

3 Includes Quebec Savings Banks and mutual benefit and fraternal societies in 1953; Quebec Savings Banks and Mortgage Investment Corporations in 1982.

Source: CMHC, Housing Statistics, March 1984, Table 78.

be eliminated. CMHC did retain a 'lender of last resort' presence in the mortgage market. In particular, mortgage insurance provided a means for chartered banks to participate in mortgage lending in a manner consistent with bank regulatory objectives; the 1954 Bank Act removed the prohibition on bank mortgage lending by allowing chartered banks to make loans insured under the new National Housing Act program.

Public mortgage insurance also provided a 'second best' solution to that portion of the credit gap attributable to regulatory limits on loan amounts in relation to the appraised value of the mortgaged collateral, and restrictions applied to junior mortgage lending. These restrictions created a very substantial downpayment constraint for households seeking owner-occupied status given the presumed absence of debt financing alternatives. As we point out below, a substantial downpayment constraint risks distorting household decisions with respect to accumulation of human capital in relation to nonhuman capital; among other things the downpayment constraint biases capital formation decisions away from human capital accumulation.

The notion that a 'credit gap' or systematic mortgage market disequilibrium creates a justification for policy intervention opens a complex set of issues. The complexity arises, in part, because of conflicts among a multitude of policies governments have pursued or have been suspected of pursuing using mortgage supply instruments, including mortgage insurance, as tools. A second complicating factor is the fact that there exists continuing major disagreements among economists regarding the existence and importance of nonprice credit rationing in the mortgage market.[9] There is even controversy over the issue of whether agreed upon evidence of continuing nonprice rationing would necessarily imply a state of chronic market disequilibrium or could be interpreted as fully compatible with equilibrium generated by competitive market conditions.[10]

The policy issue revolves around finding a resolution to conflicting objectives expressed in the simultaneous desire to use mortgage insurance to produce more competitive market results and to fulfill an economic stabilization goal. The latter issue has been further complicated by disagreement over whether the proper stabilization goal was to assist the implementation of monetary policy to stabilize macroeconomic activity or to focus upon the objective of housing market stabilization, including housing construction activity in particular.[11]

The institution of an administered ceiling on the NHA loan interest rates at the introduction of the default insurance program is corroboration of the proposition that the government viewed the residential market as imperfectly competitive. There is a lack of agreement, however, over whether subsequently the interest rate ceiling was administered to assist in meeting stabilization goals rather than being set to force lenders to behave like price-taking firms.[12] It has been alleged that in the late fifties-early sixties the NHA rate was held down so as not to be out of line with the ceiling rate on chartered bank loans imposed by the Bank Act.[13] In any case, CMHC's response to the negative funds supply impacts of the two ceiling rates was to increase direct lending again in the 1960's.[14] After the bank loan and NHA loan rate ceilings were removed in 1967 and 1969, respectively, CMHC manipulation of terms occurred largely through changes in NHA loan eligibility requirements including loan maximums and Gross Debt Service Ratio limits. The most striking rules changes were associated with the AHOP and ARP programs which appeared to have income (housing) distribution and mortgage payment design objectives, the latter to address the cash flow and downpayment constraints created by the intersection of anticipated inflation with the standard level nominal payment mortgage loan. Whatever complex and changing mix of objectives were being pursued one impact of

interest rate and eligibility requirement administration was undoubtedly to destabilize the supply of residential mortgage funds emanating from the private sector.

The question of nonprice credit rationing has two parts: (1) whether it exists in any significant way and (2) whether, if it exists, this is socially undesirable. Some economists react incredulously to assertions that nonprice rationing characterizes mortgage market operation.[15] Others believe they find strong evidence that mortgage markets are commonly in a state of substantial disequilibrium.[16] Econometric analyses are not likely to cleanly distinguish between the hypothesis that lenders administer loan terms to ration credit and the counter hypothesis that rationing is essentially fully accomplished through price (interest rate) adjustments. The difficulty in distinguishing the hypotheses empirically is that both are capable of predicting similar correlations between changes in interest rates and movements in loan provisions; in the second hypothesis these observed movements in loan terms are viewed as resulting from choices made by households attempting to meet consumption/investment/portfolio goals within the context of changing relative prices.[17] The most plausible reason nonprice rationing might exist is that mortgage lenders perceive their risk exposure increasing with certain changes in macroeconomic conditions but, lacking an ability to discriminate among differential risks across borrowers and therefore to price them, all borrowers are subjected to a narrower menu of loan-to-value, maturity, gross debt service ratio, prepayment and amortization options than previously existed. It has also been argued that attempting to ration via price alone is suboptimal because borrower risk taking incentives are positively correlated with the interest rate.[18]

There are three reasons not all economists have been abhorred by the supposed existence of nonprice rationing. The first is that some view the screening function and incentive impacts of interest rates as producing a form of nonprice rationing which is an inherent characteristic of generalized competitive equilibrium.[19] Second, the existence of disequilibrium nonprice rationing increases the likely effectivenss of any mortgage supply policy that may be favored. Third, the practice of nonprice rationing allows monetary policy to work its effects on aggregate demand with smaller changes in market interest rates. This result is viewed as desirable by those who believe the balance sheet distortions and wealth transfers across the economy produced by changes in real and nominal interest rates cause greater damage to equity/efficiency objectives than do nonprice rationing techniques.[20] The effects of the latter devices are perceived as imposed on those who, for the most part, can postpone durable goods acquisition decisions without incurring significant costs. Others argue that toleration of nonprice rationing not only produces the expected efficiency costs of continuing disequilibrium but is particularly inequitable in its effect of concentrating monetary tightness, for example, on a small subset of households attempting to relocate or accomplish a switch in tenure mode.[21]

Do any of these mortgage market characteristics provide rationales for government mortgage supply intervention in 1984? In particular, would there be a case for introducing public mortgage insurance if it did not exist? The second column of Table 1, which reflects the current diversity of mortgage credit suppliers in contrast to the concentration apparent in 1954, makes it appear doubtful that any intervention could be justified on the basis of imperfect competition due to market concentration. On the other hand, the limited mortgage loan design responses to the payment TILT issue which has

endured as an unresolved credit gap for a decade and the elimination of term, prepayment and interest rate options in the markets of the early Eighties are prominent, if casual, evidences of nonprice rationing. While it is plausible that these institutional reactions reflected uncertainty related at least in part to information gaps, it is legitimate to question whether this behavior represents socially optimal competitive equilibrium responses. It is further appropriate to raise the issue of whether government policy can improve the quality of available information, as well as provide or stimulate market responses to supply more complete risk pooling and hedging facilities. It is plausible, in principle, that public mortgage insurance could make a significant contribution to achievement of such objectives. Finally, public mortgage insurance may have a continuing role in filling credit gaps created by government regulation, including loan-to-value restrictions and restraints upon Chartered Banks lending in conventional mortgage form.

In Section III we evaluate further the potential contribution of public mortgage insurance in the context of the possible justifications for such a program that we have identified in this section.

III. THE RELEVANCE AND ROLE OF MORTGAGE INSURANCE AS A POLICY TOOL

A. Housing Policy

In the previous section we concluded that it is no longer possible to justify public mortgage insurance on the basis of generalized housing policies directed at increasing the quantity and/or quality of the housing stock. Given the forecasts of substantial declines in household formation rates in the years ahead due to the aging of the baby boom generation and the likelihood of slower growths, or even reversal, of headship rates, the case for generalized housing market intervention is likely to become even weaker. Apart from the indirect

impacts of mortgage market imperfections reviewed below, the only housing policy objectives left for consideration deal with specific groups such as the elderly, the handicapped, Native people and those living in remote areas who may be unable to find market solutions to housing needs.

The special risk groups demand consideration precisely because reports which have recommended elimination or substantial reduction in the role of public mortgage insurance (e.g. the Matthews Committee Report and the U.S. President's Commission on Housing Report) have perceived a merit based role for public insurance for the 'high risk' special unserviced borrowers. Some view a downsized CMHC as performing an 'insurer of last resort' or a reinsurance function in order to assist the flow of mortgage credit into these 'orphan' markets.[22]

However, it is not at all clear that mortgage insurance is a well defined policy tool to meet this objective. First, assistance of 'high risk' borrowers implicitly involves substantial subsidies in terms of setting premiums which are inadequate to cover the risk exposure accepted and the high operating costs that would be incurred in a limited volume program dealing with special segments of society. Second, to the extent the program is not limited to low income households, the leakages from such a subsidized program to the financing of nonhousing assets is likely to be very substantial. Third, mortgage insurance is a particularly inappropriate policy instrument for dealing with households with low permanent income; most households in these special groups who are unable to find mortgage debt financing in the market are likely to be in the permanent low income category. Mortgage insurance is well designed for the household with current low income but much higher permanent income; it allows the human capital resources of the household to be utilized as a substitute for nonhuman capital in financing homeownership. However, it is generally

inappropriate for government to induce low income/low wealth/low human capital households into high debt positions by insuring lenders against losses from default.

The above a priori observations with regard to the matching between the mortgage insurance service and the economic resources of eligible borrowers is corroborated by the history of NHA approved loans. Table 2 illustrates this experience by comparing the median income of families that received NHA loans with the median income of all families. For all periods the NHA loan families have substantially higher median incomes, excepting 1976 when the mortgage insurance program was burdened with the AHOP social assistance venture which has contributed so significantly to the insolvency of the Mortgage Insurance Fund. However, even in 1976 the median income of families receiving NHA approved loans was only slightly below that for all families. More dramatically, only 22.3 percent of NHA borrowers were drawn from the lower third cohort of family income in 1976 while 18.8 percent came from the upper third. More recently, of course, NHA insured loans have become even more a program for the middle and upper middle income groups; in 1982 47.1 percent of NHA borrowers were from the upper third of family income and only 3.6 percent from the lower third. It is difficult to imagine mortgage insurance playing a central role in any effective housing policy designed to assist unserviced borrowers.

In addition to justifying the relevance of the housing policy, advocates of mortgage insurance, or any other policy instrument designed to affect the quantity or quality of housing by increasing the supply of mortgage lending, must also be able to identify the mechanism by which a shift in the mortgage supply schedule will produce the desired impact on the housing stock. A priori, there are many reasons to suspect that 1) any impacts on housing investment will largely displace housing investment that would otherwise occur, 2) new lending

generated will largely displace mortgage loans that would otherwise occur; e.g. NHA loans displacing conventional loans, and 3) increased mortgage lending activity will be largely utilized to finance nonhousing assets or nonhousing consumption. These displacement or leakage effects can take many forms which is one reason for expecting that the displacement/leakage impacts are likely to be large. Indeed significant success of credit supply programs is dependent upon a peculiar combination of circumstances being in place; these generally involve segmentation and disequilibrium in the targeted housing and mortgage markets and a strong exclusive two way linkage between the housing and mortgage markets. If all the segmentation and disequilibrium characteristics do not hold, the credit supply policy is unlikely to provide much impact on the housing stock per dollar of program cost.

Table 2

Median Incomes of All Canadian Families Compared to
Median Incomes for Families Receiving NHA Approved Loans: Selected Years

	All Families	NHA Families
1961	$ 4785	$ 5964
1967	6839	8255
1971	9245	11240
1976	16986	16180
1982	29246	37598

Source: CMHC, Canadian Housing Statistics, 1983, Table 89.

For example, Swan (1973) examined the impact of a collection of housing subsidy programs in the U.S. upon housing starts during the decade of the Sixties. Swan's estimates are based upon a model in which no demand displacement is possible; i.e., all subsidized units created by government stimulation are assumed to be so perfectly targeted that there is no offsetting shift in the demand schedule for unsubsidized housing. However, offsets can occur in the determination of realized housing starts to the extent that the bidding for scarce labor, materials or financing resources generate demand/supply responses that produce an actual net increase in starts that is much less than the gross increase in subsidized starts. In fact, Swan finds that during the Sixties the net impact of housing policy upon housing starts was very modest despite the fact this was an era of many major government housing programs; Swan estimates that the decrease in unsubsidized starts offset 85 percent of the stimulated increase in subsidized starts. Swan believes the resource bidding that produced the offset was concentrated in the mortgage financing sector, not the labor or materials sectors, and reflected a quite inelastic supply of mortgage funds schedule within a market largely segmented from other debt markets.

A more recent study by Murray (1983) provides evidence corroborating Swan's results for an extended period (1961-1977). Murray concludes that U.S. housing programs which depended upon private sector mortgage lending had no measurable impact upon the housing stock even though the 1.19 million subsidized housing starts achieved by these programs accounted for 62 percent of all housing starts attributable to various subsidy programs. The remaining 38 percent were financed through government debt; since Murray believes that the mortgage market is largely segmented from the government debt market he hypothesizes that government lending programs will generate less displacement of starts than

programs dependent on private sector funding. He finds only slightly more than half of these starts were displaced.

However, if mortgage markets are, in fact, not segmented but rather well integrated with other debt markets, this does not necessarily imply greater effectiveness for housing programs based on shifting private sector mortgage supply schedules. Market integration is tantamount to assuming relatively highly elastic mortgage supply schedules and a dilution of the critical mortgage-housing linkages we observed above were critical preconditions to government intervention. Under these integrative conditions it is much less likely that housing investment can only be financed by mortgage debt or that mortgage financing is exclusively utilized for housing. The latter linkage is especially questionable in the case of households. If there exists a credit gap disequilibrium so that households are restricted from borrowing the desired amount at the going price in the mortgage market, and lack adequate debt market alternatives, it does not necessarily follow that the real sector impact is concentrated primarily upon the amount of housing assets in the household portfolio. Indeed the impacts may well be primarily felt in nonhousing assets or even in household consumption levels. In this latter situation a government program to increase the supply of mortgage funds, whether via mortgage insurance or other mechanisms, will largely result in increasing nonhousing consumption or the acquisition of nonhousing assets. A study based on U.S. Flow of Funds data (de Rosa, 1978) has provided evidence that household mortgage demand is triggered to a quantitatively important extent by excess demand for nonhousing assets.

There is some empirical evidence based on Canadian data that serves as counterparts to these U.S. studies. Dumas (1984) used the Candide model to simulate the impacts on sectoral output, prices and other variables of a wide

variety of loan subsidies. Through inclusion of a homothetic Cobb-Douglas utility function he also obtains a measure of the welfare effects of loan subsidy programs. Loan subsidies turn out to reduce economic welfare except in the case of subsidies to the housing sector. However, the model indicates that more direct form of subsidies (e.g. shelter allowances) would provide larger welfare benefits relative to cost. The unique positive impact of housing subsidies is attributed to a 'second best' feature via which the subsidies are correcting distortions in housing expenditure caused by property taxes. However, the results do not hold for mortgage credit policies directed to assist particular subsets of the housing market; for example, an increase in CMHC loans secured by newly constructed single detached homes is more than offset by a decrease in private mortgage lending on the same type of property. In general, government loan subsidies produce a lot of movement in private sector liabilities without having much impact on real expenditures by sector.

Smith (1981b) has estimated that the net demand creation of the AHOP loan/grant amounted to only 13 percent of the funds advanced. He suspects the ARP program had a considerable short run impact upon starts but only as a 'second best' result generated by the rental housing market disequilibrium produced by rent controls. It is doubtful that many would advocate mortgage credit intervention, whether via public mortgage insurance or in other form, as a long run 'second best' policy in preference to dealing with property tax or rent control distortions directly.

A 1982 Economic Council report[23] relying on 1977 Survey of Consumer Finances (Statistics Canada) points out that, controlling for age (life cycle position) home owners with mortgages tend to have more valuable homes, but less home equity, than homeowners without mortgages. By assuming the difference in home equity between the zero and the positive mortgage debt households is a

measure of borrowing in mortgage form to finance acquisition of nonhousing assets, the Council estimates about 40 percent of outstanding residential mortgages fund nonhousing assets. This writer has refined the calculation by using the microdata file from the same survey; if one defines mortgage financing as representing housing finance only to the extent that all of a household's net worth is absorbed in housing equity, then nearly half of outstanding home mortgage debt is supporting nonhousing activities.[24] Furthermore, this author has employed an alternative definition of those owner-occupier family units who do not require a mortgage loan to hold the house they currently own; this group is defined to be family units whose net worth exceeds 1.2 times the market value of the home. Some 45.4 percent of these family units nonetheless had a home mortgage loan providing further evidence that residential mortgage credit is being utilized in a significant way to finance nonhousing assets.[25] The same study provides statistical evidence which suggests that home mortgage financing is used differentially to finance illiquid asset acquisitions such as vacation homes, investment real estate, equity in personal business and professions and RRSP contributions.[26] It also appears that for some levels of debt requirements personal debt is utilized as a substitute for mortgage debt. This may reflect relative inflexibility in options available in mortgage loans; in any case it suggests households are not completely without debt financing alternatives to the mortgage market. It also implies that a richer menu of mortgage instruments would likely result in a higher incidence of mortgage loans to finance nonhousing objectives.

The implication of all these sorts of findings for mortgage insurance is that they seriously weaken the case for all forms of government mortgage supply intervention, including mortgage insurance, as tools to affect the housing stock. The case for mortgage insurance then is left resting on two

propositions. The first is that mortgage insurance is an effective 'second best' solution to government regulations including 1) maximum loan-to-value ratios which prohibit 'high ratio' loans without mortgage insurance and 2) the restriction on Chartered Banks conventional mortgage lending activity which has effectively restricted the banks, except via subsidiaries, to concentrating their mortgage activity in the public insured loan market. The 'second best' case rests upon a demonstration that these lending restrictions serve some substantial social welfare objective.

Investigation of whether this 'second best' case is defensible depends upon an analysis of the rationales for the imposition of lending restrictions upon mortgage loans. Several issues would deserve attention in such an investigation. Among these issues would be a review of the essential purpose of the limits on loan size in relation to collateral value, or restrictions upon junior mortgage loans or chartered bank holdings of conventional mortgage loans. In view of the dominant effect of the Gross Debt Service Ratio, the Total Debt Service Ratio and the Debt Coverage Ratio in loan underwriting criteria during the past decade, it might be concluded from such a review that loan-to-value ratios are an anachronism.

Such a review should also focus upon the fact that deposit insurance did not exist at the time these sorts of mortgage lending restrictions were imposed; to the extent the ultimate purpose of such restrictions was depositor protection, mortgage loan limits might be viewed as anachronisms on this basis as well given that deposit insurance now has a seventeen year history. On the other hand, the employment of a flat deposit insurance premium raises the possibility that, absence any premium penalty, lenders will be induced to take greater risk than they would in the absence of fixed premium deposit insurance. (The long range over which CMHC mortgage insurance premiums are flat percentages

of loan amounts may have the same risk inducing impacts).[27] This phenomenon may generate the view that mortgage lending limits (and thereby a mortgage insurance program) are essential tools to restrict the risk taking proclivities stimulated by deposit insurance. Before this view is accepted, however, a careful investigation should be undertaken of the feasibility of risk adjusted deposit premiums, or other risk reduction inducements with lower costs than the mortgage insurance program.[28] These issues should be an important part of an interagency review of the role of public mortgage insurance.

The second justification for mortgage insurance is based upon uncertainty produced by information gaps in the mortgage market. Given the substantial suggestive evidence that mortgage debt is indeed fungible, i.e. can be and is used to finance a wide variety of household portfolio and consumption objectives, this proposition depends upon there being merit good or externality criteria associated with financial markets serving household portfolio and consumption objectives in general, as opposed to criteria limited to housing asset acquisition and housing consumption expenditures. On the assumption that this broader view of social welfare objectives is generally accepted, we turn to assessing the potential role of mortgage insurance in improving mortgage market efficiency.

B. The Role of Mortgage Insurance in Improving Mortgage Market Efficiency

The most plausible welfare based justifications for government intervention in the mortgage market involve the market's inability to respond to excess demand due to uncertainty. The existence of uncertainty does not necessarily imply per se that market response will be inadequate and that government intervention will be required. The private sector may develop a rich set of contingency and insurance markets which provide facilities for risk shifting and

allow risk to be optimally allocated among various private parties. On the other hand, imperfect information, the inability to internalize the benefits from information production and innovation, transaction costs, moral hazards and adverse selection phenomena may impede the private sector from responding to market demand pressures fully and efficiently. To the extent these impediments are important barriers to mortgage market efficiency, there exists a potential case for government intervention. Completion of the case requires identification of a form of government intervention which is likely to be successful in terms of providing risk pooling or risk shifting mechanisms or improving the quality of information. The questions addressed in this section are: (1) Is there evidence of mortgage market inefficiency that may plausibly be based upon these obstacles to market responsiveness? and (2) if so, is mortgage insurance a policy tool that is likely to contribute to reduction or removal of the impediments?

1. Imperfections in the Mortgage Market

As observed briefly above there is casual evidence of market imperfection in the apparent lack of richness in mortgage loan provisions and in the absence of mechanisms for shifting risk to third parties. The poverty in loan options reflects, in part, the absence of market risk shifting facilities. For example, Canadian mortgage markets have provided very little in response to those (potential) borrowers adversely affected by the payment TILT problem. Only a slight contribution is made to alleviating this obstacle by shortening loan terms in an environment characterized by an upward sloping yield curve. However, confining options to short-term loans has shifted interest rate risk to borrowers to a greater degree than it is likely they would have opted for given a variety of choices; the ad hoc Canada Mortgage Renewal Program was testimony to this proposition. The most obvious market response to the payment TILT

problem, the inflation indexed loan, has not surfaced as a market alternative in Canada although it is available in many other countries including the United States.

Capozza and Gau (1983) have argued that the long-term, fixed nominal rate, level payment loan actually approximates the optimal time path of equity buildup for a significant set of households in a moderately inflationary world, but this option has not been available to home mortgage loan borrowers in Canada, although it remains available in the United States. The Government has recognized that Section 10 of the Interest Act has discouraged the offering of long-term fixed rate mortgages,[29] but it is doubtful that removal of this obstacle would be sufficient to stimulate redevelopment of the long-term loan alternative. Furthermore, no Canadian equivalent to the U.S. GEM mortgage has been developed; this loan design automatically increases the borrower equity buildup rate (and shortens the loan duration from the lenders perspective) when (nominal) interest rates increase. Nor has the Canadian market offered the richness in mortgage lending schemes designed to allow older homeowners to liquidate equity in their homes that are offered elsewhere in the world.

Secondary markets in mortgages are relatively undeveloped in Canada. To some extent this undoubtedly reflects a lack of demand for such facilities. The significance of national lenders who are able to obtain geographic diversification within their own portfolios has certainly made secondary market facilities much less important than in the United States. The evolution of the short-term mortgage has provided liquidity and, in principle, automatic opprtunities at renewal dates for lenders to adjust mortgage portfolios. Nonetheless, the development of secondary markets in home mortgages would undoubtedly assist in ensuring that the mortgage supply of funds schedule is highly price elastic over a wider range of amounts; this could be significant as

the traditional spread mortgage lenders (e.g. trust companies) continue to reduce their home mortgage loan commitment.[30] Pension funds and life insurance companies are arguably more likely to be induced by modest relative rate increases to supply mortgage funds in an environment characterized by strong secondary mortgage markets. On the other hand, to the extent that forecasts of weakening housing demand[31] do imply softer mortgage loan demand in the future, this rationale for secondary market development is not so credible.

A stronger justification for the development of secondary markets is as a foundation on which mortgage futures and options markets can be created to provide a place in which mortgagees and mortgagors can lay off risk. The withdrawal symptoms which afflicted Canadian mortgage lenders in the early Eighties provides abundant presumptive evidence of the inadequacy of risk shifting mechanisms. Some lenders withdrew from the market altogether, others offered only very short-term loans or only variable rate loans, choices with respect to prepayment options disappeared and the large binding downpayment constraints were reminiscent of the era prior to the introduction of mortgage insurance.[32] It appears lenders lacked confidence in their ability to price interest rate risk, prepayment options or default risk and lacked sources of information which would improve their pricing capability or market facilities that would allow allocation of unwanted risk to third parties. Some of the alternative mortgage designs, (including revival of the long-term fixed nominal rate loan) referred to above may not be viable without instruments tradeable in secondary markets and without mechanisms for reallocating risks inherent in the loan design.

Prepayment provisions, default and in longer term loans, assumability rights, can all be viewed as and priced as options. They all have important implications for lender cash flow experience as well as for realized returns

from mortgage lending. Uncertainty about future cash flow levels has restrained lenders willingness to make longer term forward commitments; the interest rate volatility and uncertainty with respect to future inflation rates and real estate values which has characterized the early Eighties has both produced substantial errors in cash flow estimates and created difficulty in determining appropriate prices for the various options contained in mortgage loans. It is clear that these options are significantly more valuable to borrowers in an era of volatile interest rates and inflation rates. From a lender's perspective there is a correspondingly greater premium on being able to make substantial short run portfolio adjustments to handle unexpected surpluses (shortfalls) in cash flows.

One measure of the increased value of secondary mortgage markets during the early Eighties is to be found in the explosive development of these markets in the United States. For example, trading of mortgage passthrough securities issued by federal agencies increased from $110 billion per year in 1981 to $500 billion in 1983 and may reach $800 billion in 1984. During this period the turnover rate in these issues has increased from 86 percent in 1981 to 267 percent in the first quarter of 1984.[33] Rapid expansion in private mortgage security obligations has paralleled, and perhaps surpassed, trading activity in government issues. An active secondary market for second mortgages has also evolved during the early Eighties. Unquestionably part of these developments is attributable to the localized nature of most mortgage lending institutions in the U.S. and to the pronounced portfolio restructuring requirements of U.S. thrift institutions in the early Eighties. Nonetheless, an important explanation for the rapidly growing demand for secondary market facilities as places to shift interest rate and cash flow risks in rapidly changing economic environments. The Canadian experience referred to above strongly suggests that

the absence of secondary market and affiliated futures and options market facilities is a market gap whose closure could contribute significantly to Canadian mortgage market efficiency.

2. Mortgage Insurance as a Policy Tool

Is there reason to believe that mortgage insurance can serve as an intervention tool to provide and to stimulate the production of higher quality information and the creation of richer loan options for borrowers and risk shifting mechanisms for lenders and borrowers? One approach to addressing this question is to examine the contributions made by mortgage insurance to mortgage market efficiency in the United States.

It is certainly arguable that a major contribution of the FHA program in the U.S. is its effective collection of and provision of access to data on mortgage loan experience. There is a very extensive U.S. literature dealing with empirical analysis of mortgage default experience; much of it is aimed at identifying the determinants of default, and losses associated with various causes of default. These studies have proven useful to lenders, secondary market buyers and sellers, and private sector insurers as well as to FHA, in pricing default risk. The bulk of this information provision via analysis of data that links default experience to loan application data and market variables is a result of FHA's commitment to data collection and provision.[34] Most of the remainder comes from the largest private mortgage insurer which now has a thirty year history.[35]

As indicated above, mortgage lenders in Canada have been hesitant historically to provide much richness in prepayment options due to uncertainty with regard to pricing of the risks involved. It also appears that uncertainty with respect to the determinants of prepayment probabilities was one of the greatest obstacles to the growth and development of secondary mortgage market

instruments in the United States. In response to this information need a very substantial empirically based literature has now developed on prepayment option pricing which has greatly enriched the information base. Again, these empirical studies have been possible only as a result of FHA's commitment to utilize its mortgage insurance program as a data collection and provision instrument.[36]

Mortgage insurance has many experimental applications as a mechanism to correct misinformation (risk misperceptions) and to add to the quality of information available to market participants. As a wider variety of nonfamily households have evolved and as an increasing proportion of married couples are both employed, lenders have been forced to reevaluate the weights provided to multiple incomes and part-time employment. The inflationary experience also raised issues with respect to the role in loan underwriting of income and house price expectations as well as of current incomes and prices. In recent years, an understanding of the extent to which households respond to loan costs and other factors in adjusting their loan balances has become increasingly important to mortgage lenders; volatile interest rates and frequent renewals have appeared to have resulted in substantial increases in the frequency and size of household balance sheet adjustments. The major national lenders should have the loan experience to perform analysis of such issues internally; more modest size lenders and, most importantly, potential mortgage lenders are dependent on analyses of publicly available data. Provision of the appropriate data is a logical function of a public mortgage insurer; such information has the potential to close unserviced borrower credit gaps and to ensure the elasticity of the supply schedule of residential mortgage funds. Successful demonstration programs are information generating mechanisms.

Mortgage insurance appears to have played a critical catalytic role in the development of secondary markets in mortgages in the United States and in the

many forms of actively traded mortgage bond instruments and in the mortgage futures and options markets which have sprung from those intermediary securities.[37] Although the recent report of the U.S. President's Commission on Housing (1982) strongly recommends increasing privitization of the secondary market intermediary functions as well as of mortgage insurance delivery, there is ample reason to believe that the existing facilities could not have developed but for the bedrock guarantees provided by public mortgage insurance. We turn next to the question of whether in the Canadian context either CMHC or the private mortgage insurance industry are likely to be capable of fulfilling the principal functions of mortgage insurance which we have identified as relevant to the 1980's.

IV. CAN CMHC OR THE PRIVATE MORTGAGE INSURANCE INDUSTRY DELIVER?

In Section III we identified a set of market gap objectives which mortgage insurance could potentially contribute to filling. These market failures represented innovation and information gaps plausibly attributable to transaction costs and the inability of private firms to internalize enough returns from initiatives in these areas to justify development costs. Included in the lack of innovative responses are sluggish responses in offering a variety of repayment and prepayment options as well as loans with real as well as nominal interest rates and a failure to develop third party mechanisms for laying off interest rate and cash flow risks analogous to existing means of buying default risk protection. Finally, in a volatile world, the inability of lenders to make quick adjustments in mortgage portfolios threatens the desired high price elasticity of the supply of mortgage funds in a market that is subject to high variances in funds demands.

In this section we address the question as to whether either CMHC or the private mortgage insurance industry can be reasonably expected to successfully address the indicated objectives. Finally, we indicate the characteristics required of a agency or corporation that would be likely to contribute in the entrepreneurial fashion required to achieve the desired goals.

A. CMHC's Ability to Utilize Mortgage Insurance to Fulfill Contemporary Goals

As we have observed above, CMHC's mortgage insurance program was undertaken with the purpose of assisting a variety of housing goals through increasing the supply of mortgage funds. Our discussion has suggested that the basic housing objectives at issue have been resolved and, consequently, they no longer form a basis for justifying a public mortgage insurance program. The only significant exception to this conclusion was the 'second best' role of mortgage insurance in offsetting distortions in household investment decisions caused by very sizable downpayment constraints imposed by government regulation.

In evaluating CMHC's ability to successfully undertake a commitment to fulfill a quite different set of contemporary objectives it is instructive to begin with a review of the slippage that has occurred in CMHC's ability to fulfill its traditional goals. At the heart of CMHC's mortgage insurance function has been its insurance of high ratio loans, which allow households who have made human capital investments to utilize that investment to achieve desired ownership tenure status. As Table 3 indicates CMHC's ability to satisfy that function appears to have deteriorated significantly in recent years; the proportion of approved loans with loan-to-value ratios in excess of 90 percent, which use to make up the majority of NHA loans, declined to zero in 1983.

Table 3

Distribution of NHA Loan Approvals Loan to Lending Value Ratios
1973-1983

Year	Less than 75%	75.1-90.0%	Over 90%
1973	7.8%	22.2%	70.0%
1974	10.2	22.5	67.3
1975	9.5	21.3	69.2
1976	9.5	17.0	73.5
1977	9.1	16.2	74.7
1978	6.1	15.6	78.3
1979	6.0	34.9	59.1
1980	9.2	43.8	47.0
1981	23.5	38.4	38.1
1982	22.4	63.2	14.4
1983	15.6	84.4	0

Source: CMHC Housing Statistics, 1983, Table 91.

This apparent reduction in the availability of high ratio loans has been accompanied by a reduction in high gross debt service to income ratios and a reduction in amortization periods as shown in Tables 4 and 5. These distributional changes may reflect, in part, shifts in demand. The liberal terms of the mid 1970's, of course, reflect the social assistance/income distribution functions which the mortgage insurance program was unfortunately required to bear. It is also arguable that the uncertainty and volatility associated with the early Eighties required more conservative insurance underwriting standards. Granting all of these arguments, there can still be little doubt that a substantial part of the explanation lies in the failure to develop a richer menu of loan repayment options which has interacted with enforcement of gross debt service ratios on current income to enforce much larger downpayment constraints; to the extent this is the case the mortgage insurance program is failing to remove the disincentives to human capital formation created by government imposed loan-to-value ratios. Lacking the opportunity to compete on a self insured basis in the high ratio first mortgage loan market, private lenders have lacked incentives to innovate.

The one initiative CMHC did undertake to ameliorate this problem was its Graduated Payment Mortgage Loan insurance program. This was introduced in 1978 to ease the effects from the phasing out of the AHOP program. This device had only limited success and has become inactive despite the fact that the 'affordability' problem produced by payment tilt remains very real for potential homeowners, renewing homeowners and potential investors in rental housing. At the time of the GPM introduction CMHC could have had an important positive impact on mortgage loan and deposit designs by choosing to insure various forms of fully and partially indexed loans. Instead, CMHC agreed to insure a very rigid vision of a GPM loan; the principal attribute of this loan design was that

Table 4

Distribution of NHA Loan Approvals by the Gross Debt Service to Income Ratio 1973-1978

Year	Less than 20%	20.1 to 27.0%	27.1 to 30%	Over 30%
1973	41.8%	46.5%	9.1%	2.6%
1974	28.3	43.9	16.1	11.7
1975	19.6	35.5	17.8	27.1
1976	16.1	32.8	14.9	36.2
1977	22.8	36.6	13.3	27.3
1978	25.7	37.8	13.2	23.3
1979	27.1	43.3	14.9	14.7
1980	25.0	43.4	16.2	15.4
1981	28.6	44.2	15.2	12.0
1982	25.3	42.7	18.9	13.1
1983	31.0	45.0	15.9	8.1

Source: CMHC Housing Statistics 1983, Table 91.

Table 5

Distribution of NHA Approved Loans by Amortization Period
1973-1983

Year	Under 25 Years	25 Years	26-30 Years	Over 30 Years
1973	1.4%	85.6%	5.3%	7.7%
1974	2.5	57.3	4.3	35.9
1975	1.9	49.1	5.5	43.5
1976	1.3	67.1	13.2	18.4
1977	2.0	70.2	14.1	13.7
1978	3.0	75.0	14.3	7.7
1979	5.3	79.2	10.5	5.0
1980	10.7	80.0	7.5	1.8
1981	14.8	76.5	7.0	1.7
1982	41.4	56.5	2.0	0.1
1983	32.9	65.1	2.0	*

* less than 0.1 percent.

Source: CMHC Housing Statistics, 1983, Table 91.

the initial payment relief provided was inversely related to the level of interest rates. Subsequently, a modification in the payments structure was introduced. In its approach to this issue, however, CMHC missed an opportunity to have a substantial impact upon innovation in mortgage financing instruments by adopting the least innovative option provided by the 1973 Federal Interdepartmental Task Force.[38] As a consequence, it appears that more mortgage instrument innovation was introduced by developers, builders, real estate investors and vendors than by the financial community or the mortgage insurers.

Neither is there evidence that CMHC has matched FHA in its dedication to collecting and making available data bases that could be utilized to price default, prepayment and assumability options. This is not because CMHC has not collected or put in computer readable form a great deal of mortgage financing information, but because the objectives of such data collection have apparently been for operational, not research uses. For example, CMHC has a computerized data base containing loan application information for individual loans that runs back at least as far as 1969 and also has individual loan claims information available in computer readable form. However, it is apparently impossible to link the two compartmentalized data sets which is necessary to perform any useful analysis on the determinants and successful predictors of default, and of losses from default. Moreover, CMHC presumably has, or should have, information from the same loans at renewal dates which ought to be linked to the application and claims information. Yet, Lea and Zorn (1983b) found that CMHC was unable to provide any data to them for purposes of modelling and estimating household behavior at renewal dates, a subject that should be of great interest to CMHC; Lea and Zorn had to rely on the records of a trust company for any empirical evidence on renewal experience.

There is very little evidence that CMHC has worked in a cooperative fashion with Statistics Canada to develop a systematic framework for data collection from households that would effectively merge income, asset, expenditure and debt financing information which is critical for an understanding of the underlying demand for mortgage financing. For example, each seven years Statistics Canada collects detailed balance sheet data from households in its Survey of Consumer Finances. This data base has value for empirical understanding of tenure choice, housing demand and financing decisions of households. Two critical ingredients of the survey information for this purpose are: 1) the purchase date of the home currently occupied by homeowners and 2) the purchase price of the home. In the May 1984 survey these questions were deleted by Statistics Canada, because, they indicated, CMHC had no interest in the information.[39] On numerous occasions, CMHC has been informed of the primary importance of pooled time series/cross section data from households to investigate the housing finance questions of relevance, and CMHC has been urged to cooperate with Statistics Canada in establishing survey data collection from household panels.[40] CMHC has, however, been unreceptive to these suggestions.

Finally, CMHC has missed opportunities to take initiatives in stimulating the development of secondary markets which have some value in themselves but particular value in the stimulus they provide in turn to the creation of instruments that better integrate mortgage and bond markets and to the development of risk hedging facilities. CMHC did conduct mortgage loan auctions during the 1961-65 period which represented an early experiment at determining the need for a secondary mortgage market.[41] It did not, however, take initiatives in pooling and packaging mortgage loans in a manner that might provide a better test of the market demand. More importantly, CMHC appears to have committed itself to avoid stimulating a major innovation in Canadian

mortgage facilities in the manner in which it is introducing the Mortgage Rate Protection Program.[42] By not incorporating hedging or reinsurance strategies into its program, CMHC fails to protect policyholders against catastrophic rate increases while at the same time exposing itself to the risk of catastrophic losses. Most significantly, however, CMHC is failing to seize an opportunity through its potential hedging demands via this program to stimulate private sector innovation in developing mortgage futures and options markets in Canada. As we have observed above, the objective of increasing the richness of the mortgage menu available to borrowers is dependent, in part, upon the ability of lenders or borrowers to lay off interest rate and cash flow risks upon third parties.

Finally, the insolvency of the Mortgage Insurance Fund reflects CMHC's vulnerability to imposition of political objectives which are inconsistent with insurance principles. In order to fulfill the objectives we have identified, an agency delivering mortgage insurance needs to be insulated from the incorporation of social assistance or other unrelated objectives into its insurance program. Thus, we conclude that CMHC does not appear to be constitutionally, bureaucratically or institutionally well suited to carry out the relevant contemporary objectives of a public mortgage insurance program. We turn next to the question of whether the private mortgage insurance industry is capable of filling the goal.

B. The Capability of the Private Mortgage Insurance Industry in Canada

The short answer to the question of whether it is prudent to believe that the Canadian private mortgage industry would fulfill the information/innovation gap goals we have delineated in the absence of public mortgage insurance is 'No'. For some observers the critical issue is whether the private mortgage

insurance market would be under sufficient competitive pressure to perform innovative initiatives as well as to price mortgage insurance in a competitive fashion.[43] There are certainly scale economies in the supply of mortgage insurance; they arise in a major way because mortgage insurance contains a large element of 'fundamental' or 'catastrophic' risk which cannot be diversified away. The substitute for diversification is either i) large initial capital infusion or ii) a long run of good luck (low claims experience) which allows a buildup of contingency reserves. In an era of uncertainty with respect to interest rates and real estate values a private insurer must have achieved a substantial capital/reserves scale to be credible to mortgage lenders shopping for mortgage insurers. Given the probable scale of the Canadian market this is likely to mean, at best, a very small number of private suppliers.

Concentration is not however, a concern for the usual reasons relating to imperfectly competitive markets. The Canadian mortgage market is characterized by a number of large lenders active throughout the mortgage market. These lenders are able to obtain within their portfolios all the risk pooling and diversification a mortgage insurer can supply. These lenders essentially seek a form of reinsurance through the mortgage insurance industry and will not demand the service if it is more costly than the self-insurance they are already capable of providing. This ought to be a fundamentally effective competitive control upon pricing.

Unfortunately for the private mortgage insurance industry this major source of competition also places limits on the scale and potential viability of the industry. Although the removal of CMHC from mortgage insurance activity would increase the potential market for private insurers, the freed market is dominated by higher risk borrowers. CMHC's policy of setting a flat premium over a wide range of risks has assured it of adverse selection; by the same

token it has provided the private insurance industry an opportunity to focus upon insuring the high quality, low risk segment of the market. It is this potentially greater risk exposure of private mortgage insurance firms that is the principal source of doubt about the likelihood of the development of a viable, innovative private mortgage insurance industry in the environment of the early 1980's. The shrinkage of the industry from four firms to one, which has suffered from an unfavorable claims experience in recent years, does not lend an optimistic perspective with respect to the contribution likely to be made by the private industry.

C. The Alternative

If neither CMHC or the private mortgage insurance industry are likely to be capable of meeting the goals identified, is there any imaginable entity which has the prospect of success? To fulfill the information/innovation goals would appear to require an entity with the ability and incentive to perform imaginative entrepreneurial initiatives and to visualize how it can internalize some of the benefits of applied research conducted on information it collects and inventories at a significant cost. Such an entity requires significant initial capitalization and a source of contingency capital to cover circumstances where market experiments are unrewarding in terms of the entity's income statement. At the same time the entity has to be insulated from the attempt to intrude incompatible short-term political goals into its operation. These criteria suggest investigating promising forms of hybrid private-government corporations.

Analogues are available both in the context of mortgage market entities in the United States and hybrid corporations in nonfinancial markets in Canada. In the U.S. the Federal National Mortgage Association was created in 1938 as a

government agency charged with creating a secondary market in FHA insured mortgages. For thirty years the agency's contribution was limited to occasional purchases of mortgage loans; it rarely sold loans or acted to stimulate creation of true secondary market facilities. However, FNMA was converted to a private (quasi public) corporation in 1968 and since that time has been an active participant in the evolution of secondary mortgage markets in the U.S.

A more recent example is the Federal Home Loan Mortgage Corporation which was created in 1970 to develop a secondary market for uninsured loans; it has since been partially privatized which was followed by increasingly innovative activity in loan packaging and provision of intermediary conduits between loan organizations and investors. The U.S. President's Commission on Housing regarded these initiatives as so successful that they recommended more complete privatization of both FNMA and FHLMC.[44] Canadian quasi public (private) analogues are available in transportation and other industries.

V. CONCLUSIONS

A. Housing Goals and Mortgage Insurance

The original rationale for government intervention in the form of the NHA public mortgage insurance program, and its predecessor joint loan program, was rooted in the concept of housing as a merit good and in the view that a quality housing stock generates positive externalities. The choice of a mortgage supply intervention instrument was based largely upon the view that a socially suboptimal housing stock resulted, in part, from chronic disequilibrium 'credit gap' conditions in the residential mortgage market. Housing inadequacy was characterized in terms of overcrowding and specific inadequacies in quality standards. By the definitions utilized in 1954, crowding and quality insufficiencies were eliminated as visible social issues during the 1960's. The

only remaining housing issue that has been suggested as justifying mortgage insurance are alleged pockets of unserviced households; however, most groups identified as 'unserviced' are likely dominated by permanent low income households; mortgage insurance is not designed to meet the needs of households in this condition. Consequently, there do not appear to exist any stated housing policy objectives which would sustain a case for the introduction or continuance of public mortgage insurance. Moreover, there are substantive reasons to doubt that policies directed at increasing the private sector supply of mortgage funds are an effective means of meeting housing goals. This skepticism rests on the likelihood that, in some market circumstances, increases in housing demand are largely dissipated in factor (including financing) price increases and upon evidence that a large, and probably growing, percentage of incremental mortgage financing is utilized to fulfill nonhousing objectives of borrower households.

B. Household Goals and Mortgage Insurance

If housing goals no longer provide a basis of support it is relevant to inquire whether household activities generally have merit status or generate positive externalities. If so, then it is further relevant to investigate whether capital market imperfections distort household decisions in a way that produces socially suboptimal results in some critical respects. In recent years there exists casual evidence that mortgage lenders have been inhibited in responding innovatively to the impact of economic events including higher levels of inflation, anticipated inflation and accompanying increases in volatility in inflation rates, interest rates and real economic activity. To the extent that the resulting 'credit gaps' are the product of imperfect information then it is conceivable that government intervention in the form of public mortgage

insurance may be a useful tool to fill information gaps. The existence of credit gaps may cause significant distortion in household decisions; in particular, downpayment constraints which restrict the ability of households to liquify human capital are likely to distort household decisions with respect to the composition of their capital accumulation and risks socially suboptimal investment in human capital.

C. Mortgage Insurance and Information Imperfection

The experience of the Federal Housing Administration in the U.S. suggests that a mortgage insurance program can be utilized as an information generating device. Partly this is achieved through demonstration effects via insuring innovative loan instruments and, in the process, providing marketing and public education services. It seems clear from the U.S. experience that another important component of information provision through mortgage insurance is via systematic collection of household data from loan insurance applicants and provision of access to the data to researchers. A very rich and extensive body of empirical evidence based upon FHA data has greatly improved the accuracy of market information regarding the determinants of mortgage loan payment interruptions or terminations from delinquency, default, partial prepayment and full prepayment. These empirical analyses have provided the basis for developing payment forecasting models which allow more efficient pricing of default and prepayment options and have encouraged development of a richer menu of mortgage instruments.

D. The 'Second Best' Care for Public Mortgage Insurance

There is a potential justification for public mortgage insurance based upon two propositions. One is that mortgage insurance is required as a 'second best'

means of ensuring that household human capital is usable as a substitute for nonhuman capital in financing homeownership. In this view, insurance is required as a 'second best' device because regulations limiting mortgage lender loan-to-value ratios and restricting junior mortgage lending are accepted as givens. Before this rationale is adopted, however, a serious review should be conducted of alternatives to the risk insensitive deposit insurance premium structure that is providing the justification for public mortgage insurance intervention.

E. Is Public Mortgage Insurance Necessary?

The potential roles indicated for public mortgage insurance could, in principle, be performed by a healthy private mortgage industry. However, it is not clear either a priori or from the recent experience of private mortgage insurance firms in Canada that there is adequate market demand at a price that would be profitable to efficient private sector suppliers of mortgage insurance. In particular, it is not obvious that private mortgage insurance can be price competitive with the implicit self insurance premiums charged by national mortgage lenders in Canada, even in the absence of subsidized competition from CMHC. A tenuous private mortgage insurance industry is likely to contribute little in the way of perfecting market information. Consequently, if a review of the potential rationales of mortgage insurance suggested in this paper confirms the desirability of mortgage insurance in Canada, some public presence in the industry may be required until the information imperfections and regulations behind the 'second best' argument are substantially eliminated, and there is renewed confidence in the innovative responsiveness of the mortgage lending industry.

F. Can CMHC Do the Job?

Fulfilling the objectives of public mortgage insurance identified in this paper requires a public agency which is innovative, prepared to conduct experiments and focussed upon collection and distribution of data designed to improve the basis upon which market participants can price various lending risks. One component of the evaluation of public mortgage insurance should consist of an objective review of whether CMHC is constitutionally and bureaucratically capable of carrying out a set of objectives fundamentally different from the goals it has historically pursued. As a part of this process, alternative quasi private/public enterprises should be considered as potential delivery mechanisms.

Footnotes

1 Smith (1981b), p. 338.

2 Smith (1981b), p. 339.

3 Jones (1984), Table 1-4, p. 28.

4 Matthews Report (1979), pp. 48-50.

5 See Smith (1984).

6 See Lea (1981), Downs (1981), Lowrey (1982), and Hendershott and Villani (1980).

7 See, for example, McFadyen and Hobart (1979), Buser and Sanders (1983), Cerf (1983), Clayton (1974), de Leeuw and Ozanne (1979), Diamond (1980), Ebrill and Possen (1982), Hendershott and Schilling (1981), Hendershott and Slemrod (1983), Rosen and Rosen (1979), Villani (1981), Weiss (1978) and White and White (1977).

8 See Weicher (1978), Schwab (1983), Lessard and Modigliani (1975), Kearl (1979), Follain (1982), Alm and Follain (1982) and Kesselman (1981).

9 For some views see Arcelus and Meltzer (1973), Muth (1962), Baltensperger (1978), De Rosa (1978), Gibson (1973), Jaffe and Rosen (1978, 1979, 1981), Kent (1980), Meltzer (1974), Rudolph and Zumpano (1982), Dhrymes (1983), Jaffe and Russell (1976) and Ostas and Zahn (1975).

10 For example, while the work by D. M. Jaffe and various coauthors is clearly in the disequilibrium mode, Stiglitz and Weiss (1980a, 1980b, and 1981) view credit rationing as an equilibrium generated by competitive forces.

11 See Smith (1968), Gibson (1973), Maisel (1965), Chung (1976) Ch. 2, and Clemhout (1981).

12 Compare, for example, Smith (1967) with Smith (1977).

13 Matthews Report (1979), p. 7.

14 Ibid., pp. 7-9.

15 For example Muth (1962) and Meltzer (1974).

16 For example, Jaffe and Rosen (1978).

17 See Muth (1962) and Ostas and Zahn (1975).

18 Stiglitz and Weiss (1980b and 1981).

19 Stiglitz and Weiss (1980a, 1980b and 1981).

20 See Gibson (1973) p. 665 and Cooley and Corrado (1978).

21 See the discussion in Gibson (1973).

22 See Fallis, Discussion Paper No. 239 (1983), Ch. 3.

23 Intervention and Efficiency, p. 68.

24 Based upon owner households with employed heads and net worth in excess of home equity, 49.2 percent of mortgage debt reported in the 1977 Survey represented mortgage financing in excess of what households would require if all net worth was applied to equity in the home actually owned.

25 Jones (1984), p. 165.

26 Ibid., Ch. 3.

27 Both deposit insurance and CMHC mortgage insurance premiums are well below their counterparts in the United States. Canadian deposit insurance premiums have been reduced several times since the inception of the Canadian Deposit Insurance Corporation in 1967. For a review of the program's history see Boreham, Shapiro, Solomon and White (1979).

28 The issue as to whether risk adjusted deposit premiums are feasible has received much attention in recent years in the United States. For some perspectives see the differing views embodied in reports of the two major U.S. insuring agencies (Federal Deposit Insurance Corporation (1983) and Federal Home Loan Bank Board (1983)). Also see Horvitz (1983), Peterson (1983), Flannery and Protopapadakis (1984) and Kane (1983).

29 Improved Security for Homeowners, 1984, p. 13.

30 Mortgage loans declined as a proportion of total assets of Trust Companies from 73.4% in 1978 to 60.1% in 1982. (Canadian Housing Statistics, 1983, Table 75).

31 See Brown (1983).

32 See Jones (1983).

33 The data are from Villani (1984).

34 Examples of empirical analysis of the determinants of delinquency and/or default based upon FHA experience are von Furstenberg (1969 and 1970b), Herzog and Early (1970), Vandell (1978), Barth, Cordes and Yezer (1980), Jackson and Kaserman (1980) and Schafer (1978).

35 See Gau (1978) and Campbell and Dietrich (1984).

36 See especially Peters (1979) and Peters (1980), Curley and Guttentag (1974), Dunn and McConnell (1981a and 1981b), Navratil (1984) and Pinkus.

37 For support of this view see The Report of the President's Commission on Housing (1982).

38 Kesselman (1981).

39 Letter to the writer from the Chief, Housing Surveys and Data Dissemination Section, Consumer Income and Expenditure Division, Statistics Canada.

40 For example, this was a principal point of discussion in the January 1982 conference organized by CMHC to consider alternative mortgage instruments.

41 Mortgage Loan Insurance Assessment Report (1984), p. 21.

42 See Improved Security for Homeowners, and Capozza and Gau (1984).

43 See Fallis, Discussion Paper No. 239 (1983), pp. 71-5.

44 The Report of the President's Commission on Housing (1982), p. 162 and pp. 167-8.

Bibliography

Aaron, H. Shelter and Subsidies: Who Benefits from Federal Housing Policies? Brookings Institution, Washington, D.C., 1972.

Alm, J. and J. R. Follain, Jr. "Alternative Mortgage Instruments: Their Effects on Consumer Housing Choices in an Inflationary Environment", Public Finance Quarterly, 10:1982, pp. 134-57.

Arcelus, F. and A. H. Meltzer "The Markets for Housing and Housing Services", Journal of Money, Credit and Banking, 5:February 1973.

Baltensperger, E. "Credit Rationing: Issues and Questions", Journal of Money, Credit and Banking, 10:2, May 1978.

Barth, J. R., J. J. Cordes and A. M. J. Yezer "Financial Institution Regulations, Redlining and Mortgage Markets", Financial Institutions Regulation, Federal Reserve Bank of Boston, 1980.

Barth, J. R., J. J. Cordes and A. M. J. Yezer "FHA Mortgage Insurance and High-Risk Mortgage Lending: Some Lessons for Policy", Housing Finance Review, 2:2, April 1983.

Boreham, G. F. with E. Shapiro, E. Solomon and W. White Money and Banking: Analysis and Policy in a Canadian Context, Holt, Rinehart and Winston of Canada Ltd., 2nd ed., 1979.

Brown, P. W. "The Demographic Future: Impacts on the Demand for Housing in Canada, 1981-2001", in M. A. Goldberg and G. W. Gau, North American Housing Markets into the Twenty-First Century, Ballinger: Cambridge, Ma., 1983.

Buser, S. A. and A. B. Sanders "Tenure Decisions Under a Progressive Tax Structure", AREUEA Journal, 11:3, Fall 1983.

Campbell, T. S. and J. K. Dietrich "The Determinants of Default on Insured Conventional Residential Mortgage Loans", Journal of Finance, December 1983.

Canadian Housing Statistics, 1983. Canada Mortgage and Housing Corporation, Ottawa, March 1984.

Capozza, D. R. and G. W. Gau "Mortgage Rate Insurance and the Canadian Mortgage Market", Canadian Public Policy, X:3, September 1984.

Carf, A. R. "Homeownership: Tax Incentives and National Policy", Univ. of California, Berkeley, Center for Real Estate and Urban Economics, W.P. 83-58, March 1983.

Chung, J. H. Cyclical Instability in Residential Construction in Canada, Economic Council of Canada, Ch. 1, 1976.

Clayton, F. A. "Income Taxes and Subsidies to Homeowners and Renters: A Comparison of U.S. and Canadian Experience", Canadian Tax Journal, XXII:May/June, 1974.

Clemhout, S. "The Impact of Housing Cyclicality on the Construction of Residential Units and Housing Costs", Land Economics, 57:4, November 1981.

C.M.H.C. Mortgage Loan Insurance Assessment Report, Program Evaluation Division, July 1984.

Cooley, T. and C. Corrado "Competing Goals of Stabilization Policies: A Reassessment of Policies Toward Housing", U.S. Federal Reserve Board, 1978.

Curley, A. J. and J. M. Guttentag "The Yield on Insured Residential Mortgages", Explorations in Economic Research, Summer 1974.

Damus, S. "Government Loan Subsidies", Economic Council of Canada, Supply and Services Canada, Ottawa, 1984.

de Leeuw, F. and L. Ozanne "The Impact of the Federal Income Tax on Investment in Housing", Survey of Current Business, U.S. Department of Commerce, 59(12):December 1979.

de Rosa, P. "Mortgage Rationing and Residential Investment", Journal of Money, Credit and Banking, X:1, February 1978.

Dhrymes, P. J. "On the Determinants of the Probability of First-Home Acquisitions and its Relation to Credit Stringency" in R. E. Grieson (ed.) The Urban Economy and Housing. Lexington: Toronto, Ch. 4, 1983.

Diamond, D. B., Jr. "Taxes, Inflation, Speculation and the Cost of Homeownership", AREUEA Journal, 8:Fall 1980.

Downs, A. "Are We Using Too Much Capital for Financing Housing?" in Federal National Mortgage Association, Housing Finance in the Eighties: Issues and Options, Washington, D.C.: FNMA, May 1981, pp. 66-79.

Dunn, K. B. and J. J. McConnell "A Comparison of Alternative Models for Pricing GNMA Mortgage Backed Securities", Journal of Finance, May 1981(a).

Dunn, K. B. and J. J. McConnell "Valuation of GNMA Mortgage Backed Securities", Journal of Finance, June 1981(b).

Ebrill, L. P. and V. M. Possen "Inflation and the Taxation of Equity in Corporations and Owner-Occupied Housing", Journal of Money, Credit and Banking, 14:1, February 1982.

Economic Council of Canada, Intervention and Efficiency, Supply and Services Canada, Ottawa, 1982.

Fallis, G. "Governments and the Residential Mortgage Market I: A Normative Analysis", Economic Council of Canada, Discussion Paper No. 239, September 1983.

Fallis, G. "Governments and the Residential Mortgage Market II: Programs and Evaluations", Economic Council of Canada, Discussion Paper No. 240, September 1983.

Federal Deposit Insurance Corporation, Deposit Insurance in a Changing Environment, A report on deposit insurance to the Congress from the Federal Deposit Insurance Corporation, Washington, D.C., April 15, 1983.

Federal Home Loan Bank Board, Agenda for Reform: A report on deposit insurance to the Congress from the Federal Home Loan Bank Board, Washington, D.C., March 1983.

Flannery, M. J. and A. A. Protopapadakis "Risk-Sensitive Deposit Insurance Premia: Some Practical Issues", Federal Reserve Bank of Philadelphia Business Review, Sept./Oct. 1984.

Follain, J. R., Jr. "Does Inflation Affect Real Behavior: The Case of Housing", Southern Economic Journal, 48:1982, pp. 520-82.

Gau, G. W. "A Taxonomic Model for the Risk-Rating of Residential Mortgages", Journal of Business, 51:4, 1978.

Gibson, W. E. "Protecting Homebuilding from Restrictive Credit Conditions", Brookings Papers on Economic Activity, 3:1973.

Harter, T. R. and S. E. Schell "Competition and Evolution in the Residential Mortgage Market", Mortgage Banker, January 1981.

Hendershott, P. H., S. Hu and K. E. Villani "The Economics of Mortgage Terminations: Implications for Mortgage Lenders and Mortgage Terms", Housing Finance Review, 2:2, April 1983.

Henderrshott, P. H. and J. S. Schilling "The Economics of Tenure Choice", Research in Real Estate: 1 (C.F. Sirmans, ed.). Greenwich: JAI Press, 1981.

Hendershott, P. H. and J. Slemrod "Taxes and the User Cost of Housing for Owner Occupied Housing", AREUEA Journal, 10:4, Winter 1983.

Hendershott, P. H. and K. E. Villani "Secondary Mortgage Markets and the Cost of Mortgage Funds", AREUEA Journal, Spring 1980.

Herzog, J. P. and J. S. Earley Home Mortgage Delinquency and Foreclosure,

Horvitz, P.M. "The Case Against Risk-Related Deposit Insurance Premiums", Housing Finance Review, 2:3, July 1983.

Hu, J. C. "The Revolution in 'Securitizing' Residential Mortgages", Real Estate Review, 14:2, Summer 1984.

Improved Security for Homeowners, Department of Finance, Ottawa, February 1984.

Jackson, J. R. and D. Kaserman "Default Risk on Home Mortgage Loans: A Test of Competing Hypothesis", Journal of Risk and Insurance, December 1980.

Jaffe, D. M. and K. T. Rosen "Estimates of the Effectiveness of Stabilization Policies for the Mortgage and Housing Markets", Journal of Finance, 33:June 1978.

Jaffe, D. M. and K. T. Rosen "Mortgage Credit Availability and Residential Construction", Brookings Papers on Economic Activity, 2, 1979.

Jaffe, D. M. and K. T. Rosen "The Demand for Housing and Mortgage Credit: The Mortgage Credit Gap Problem", Center for Real Estate and Urban Economics, University of California, Berkeley, W.P. 81-23, 1981.

Jaffe, D. M. and T. Russell "Imperfect Information, Uncertainty and Credit Rationing", Quarterly Journal of Economics, November 1976.

Jones, L. D. "The Role of Rollover Mortgages, Variable Rat Mortgages and Graduated Payment Mortgages in the Canadian Housing Finance System", CMHC Conference, January 1982.

Jones, L. D. "The State of the Rental Housing Market: Implications for CMHC and Federal Government Housing Policy in the 1980's", Prepared for Canada Mortgage and Housing Corporation, May 1983.

Jones, L. D. "The Case of the Nervous Lenders - Implications for the Future of Housing Finance", Research in Urban Land Economics, Working Paper No. 10, Faculty of Commerce, University of British Columbia, 1983.

Jones, L. D. Wealth Effects on Households' Tenure Choice, Housing Demand and Housing Finance Decisions, (prepared under a CMHC External Research Grant), September 1984.

Kane, E. J. "A Six-Point Program for Deposit-Insurance Reform", Housing Finance Review, 2:3, July 1983.

Kearl, J. R. "Inflation, Mortgages and Housing", Journal of Political Economy, 87:October 1979.

Kearl, J. R. and F. S. Mishkin "Illiquidity, The Demand for Residential Housing, and Monetary Policy", Journal of Finance, XXXII:5, December 1977.

Keeton, W. "Equilibrium Credit Rationining", Garland Press: New York, 1979.

Kent, R. J. "Credit Rationing and the Home Mortgage Market", Journal of Money, Credit and Banking, 12:3, August 1980.

Kesselman, J. R. "Mortgage Policies for Financial Relief in Inflationary Periods", Canadian Public Policy, VII:1, Winter 1981.

Lea, M. "Is There Too Much Capital for Housing", U.S. Department of Housing and Urban Development, Washington, D.C., 1981.

Lea, M. J. and P. Zorn "Interest Rate Fluctuations and Mortgage Repayment: An Analysis of the Canadian Rollover Mortgage Investment", unpublished, May 1983(a).

Lea, M. J. and P. M. Zorn "Economic Fluctuation and Lender Portfolio Change", unpublished, December 1983(b).

Lessard, D. R. and F. Modigliani "Inflation and the Housing Market: Problems and Potential Solutions", in F. Modigliani and D. Lessard (editors) New Mortgage Designs for Stable Housing in an Inflationary Environment, Federal Reserve Bank of Boston, Conf. Series No. 14, Jan. 1975.

Lowry, I. S. "Rental Housing in the 1970's: Searching for the Crisis", RAND: Santa Monica, 1982.

MacRae, C. D. and R. J. Struyk "The Federal Housing Administration (FHA), Tenure Choice, and Residential Land Use", Journal of Urban Economics, 4, 1977.

McFadyen, S. and R. Hobart The Impact of Inflation on the Canadian Housing Market, Urban Growth and Land Directorate, Ministry of State for Urban Affairs, Ottawa, 1979.

MacRae, C. D., M. A. Turner and A. M. J. Yezer "Determinants of FHA Insurance in Urban Neighborhoods", Housing Finance Review, 1:1, January 1982.

Maisel, S. "The Relationship Between Finance and Expenditures on Residential Construction" in Conference on Savings and Residential Finance, Proceedings, U.S. Savings and Loan League: Chicago, 1965.

Matthews, D. J. (Chairman) Report on the Canada Mortgage and Housing Corporation, Ottawa, October 1979.

Meltzer, A. H. "Credit Availability and Economic Decisions: Some Evidence from the Mortgage and Housing Markets", The Journal of Finance, 29:June 1974.

Merton, R. C. "An Analytic Derivation of the Cost of Deposit Insurance and Loan Guarantees: An Application of Modern Option Pricing Theory", Journal of Banking and Finance, June 1977.

Mortgage Loan Insurance Assessment Report, Program Evaluation Division, Canada Mortgage and Housing Corporation, July 1984.

Murray, M. P. "Subsidized and Unsubsidized Housing Starts: 1961-1977", The Review of Economics and Statistics, 65:4, November 1983.

Muth, R. "Interest Rates, Contract Terms and the Allocation of Mortgage Funds", The Journal of Finance, March 1962.

Navratil, F. J. "The Estimation of Mortgage Prepayment Rates", Federal Home Loan Bank Board Research Working Paper No. 112, April 1984.

Ostas, J. R. and F. Zahn "Interest and Non-Interest Credit Rationing in the Mortgage Market", Journal of Monetary Economics, April 1975.

Pensions and Mortgages: Housing Investment Opportunities for the 80's, U.S. Dept. of Housing and Urban Development, HUD-UI-767, March 1984.

Peters, H. F. "Default and Prepayment Rates of FHA-Insured Mortgages", Research Paper of the Federal Reserve Bank of Philadelphia, 1979.

Peters, H. F. "Prices and Yields on Mortgage-Backed Securities - The Assumptions Make the Difference" Mortgage Banker, September 1980.

Peters, H. F., S. M. Pinkus and D. J. Askin "Default: The Last Resort", Secondary Mortgage Markets, 1:3, August 1984.

Peterson, P. T. "The Case Against Risk-Related Deposit Insurance Premiums: A Contrary View", Housing Finance Review, 2:3, July 1983.

Pinkus, S. M. "The Efficiency of the Market for GNMA Mortgage Pass-Through Securities", Mortgage-Backed Securities Research Special Report Series, Merrill Lynch Capital Markets (undated).

The Report of the President's Commission on Housing, Washington, 1982.

Rosen, H. S. and K. T. Rosen "Federal Taxes and Homeownership: Evidence from Time Series", Journal of Political Economy, 88:1980, pp. 59-75.

Rudolph, P. M. and L. V. Zumpano "A Test of the Equilibrium Credit Rationing Hypothesis", Housing Finance Review, 1:4, October 1982.

Schafer, R. "Mortgage Lending Decisions: Criteria and Constraints", Joint Center for Urban Studies, Cambridge, Mass., December 1978.

Schwab, R. M. "Real and Nominal Rates and the Demand for Housing", Journal of Urban Economics, 13:2, March 1983.

Slemrod, J. "Down-Payment Constraints: Tax Policy Effects in a Growing Economy with Rental and Owner-Occupied Housing", Public Finance Quarterly, 10:2, April 1982.

Smith, L. B. "On the Economic Implications of the Yield Ceiling on Government-Insured Mortgages", Canadian Journal of Economics and Political Science, 33:August 1967.

Smith, L. B. "Postwar Canadian Housing Policy in Theory and Practice", Land Economics, XLIV:August 1968.

Smith, L. B. "An Analysis of the Effects of the Removal of the Yield Ceiling on Federally Insured Mortgages in Canada", The Journal of Finance, XXXII:1, March 1977.

Smith, L. B. "Housing Assistance: A Re-evaluation", Canadian Public Policy, 7:3, Summer 1981(a).

Smith, L. B. "Canadian Housing Policy in the Seventies", Land Economics, 57:3, August 1981(b).

Smith, L. B. "Household Headship Rates, Household Formation and Housing Demand in Canada", Land Economics, 60:2, May 1984.

Statistics Canada, Home Ownership and Mortgage Debt in Canada, 1977, Consumer Income and Expenditure Division, July 1979.

Stiglitz, J. E. and A. Weiss "Credit Rationing in Markets with Imperfect Information, Part II: Constraints as Incentive Devices", Econometric Research Program, Research Memorandum No. 268, Princeton University, August 1980.

Stiglitz, J. E. and A. Weiss "Credit Rationing in Markets with Imperfect Information, Part I", Econometric Research Program, Research Memorandum No. 267, Princeton University, August 1980.

Stiglitz, J. and A. Weiss "Credit Rationing in Markets with Imperfect Information", American Economic Review, 71:3, June 1981.

Swan, C. "Housing Subsidies and Housing Starts", AREUEA Journal, 1:Fall 1973.

Tuccillo, J., R. Van Order and K. Villani "Homeownership Policies and Mortgage Markets, 1960 to 1980", Housing Finance Review, 1:1, January 1982.

Vandell, K. D. "Default Risk Under Alternative Mortgage Instruments", Journal of Finance, December 1978.

Villani, K. "The Tax Subsidy to Housing in an Inflationary Environment: Implications for After-Tax Housing Costs", in C. F. Sirmans Research in Real Estate, Vol. I, Greenwich, Conn.: JAI Press, 1982, pp. 31-86.

Villani, K. "Economic Viewpoint", Freddie Mac Reports, 2:10, October 1984.

Von Furstenberg, G. M. "Default Risk on FHA Insured Home Mortgages as a Function of the Terms of Financing: A Quantitative Analysis", Journal of Finance, June 1969.

Von Furstenberg, G. M. "Risk Structures and the Distribution of Benefits Within the FHA Home Mortgage Insurance Program", Journal of Money, Credit and Banking, 2:3, August 1970(a).

Von Furstenberg, G. M. "The Investment Quality of Home Mortgages", Journal of Risk and Insurance, 37:3, September 1970(b).

Waldo, R. L. "The Role of Private Mortgage Insurance", Mortgage Banking, February 1982.

Weicher, J. C. "New Home Affordability, Equity and Housing Market Behavior", AREUEA Journal, 6:4, Winter 1978.

White, M. and L. J. White "The Tax Subsidy to Owner-Occupied Housing: Who-Benefits", Journal of Public Economics, 7:1977.

Weiss, Y. "Capital Gains, Discriminatory Taxes and the Choice Between Renting and Owning a House", Journal of Public Economics, 10:February 1978.

Williamson, J. C. "The Private Mortgage Insurance Industry: O Brave New World", Mortgage Banker, February 1980.